Study of acariasis in cattle and ticks resistance against cypermethrin in Al-Najaf province

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Summary

The present study was carried out at September 2010 to evaluated tick infestation of cattle in Al-Najaf province with diagnosis of cypermethrin resistance by using FAO larval packet test and modified larval packet test. The result showed that the infestation rate of acariasis was 54.34%. The identification of ticks revealed that 55.06% of collected ticks were *Hayaloma spp.*, while the percentage of *Boophilus* spp. and *Rhipicephalus* spp. Were 31.86% and 13.08% respectively. According to site of infestation, the highest percentage was recorded in udder 45%, followed by perineal region 25%, head –neck 18% and others 7%.

The LPT results showed there was no significant variation ($P \leq 0.01$) between the mortality rates of *Boophilus* (96.42%) and *Hyaloma* (96.72%) at recommended dose. In other hand, the MLPT method showed that the mortality rate of *Boophilus* larvae at recommended and double recommended doses were 94.82% and 98.04% respectively, while all the *Hyaloma* larvae were killed at the recommended dose.

Introduction

The infestation with ticks can cause vast losses in farm animal's production, due to tick borne diseases, tick paralysis and physical damage as well as to huge financial losses due to tick control(1). The most common method to control ticks is use of different types of chemical acaricides which are used in different method of applications such as dressing, spraying ,systemic and dipping(2).

The prolonged incorrect use of acaricides may cause resistance in ticks against acaricides(3). The resistance can be caused by numbers of mechanisms (4), and when resistant ticks survive, they pass this ability by genetic to their offspring, the higher reproductive rate of ticks that have heritable resistance factors well resulting to increase in proportion of population of tick that carry genes of acaricides resistance (3).

Many methods were developed to diagnosis of acaricides resistance in ticks, and the most reliable and simplest one is the larval packet test with some slight modification to reduce contamination between different concentration(5).

There are little references about resistant tick against acaricides in Iraq, particularly in Al-Najaf governorate, therefore the present study was designed to quick estimation of tick population of cattle in Al-Najaf province with diagnosis of acaricide resistance by using FAO larval packet test and modified larval packet test.

Materials and methods

Herdsmen questionnaire: thirty herdsmen were interviewed to obtain information about the acaricide of choice, method of application and how to calculate the concentration of recommended dose.

Animals and tick collecting: the study was carried out in Mid-Euphrates region at September 2010, were 231 cattle examined for presence of ticks. After restraining of animals, the ticks were collected with maximum of three ticks / animal. The collected ticks were identified according to Margaret et al (6).Fifteen engorged ticks of either *Boophilus* and *Hyalomma* were incubated separated glass containers at 27^0C and relative humidity about 75% until ovipostion ,after that the adult ticks were removed ,while the eggs were kept in the same condition.

Preparation of acaricides: commercial cypermethrin were purchased from local veterinary stores with the following information:

trade name	Inothrine
manufacturer	INOUKO /france
purity	5%
batch no.	16558f1
package	200 ml

The diluent solution was prepared by mixing chloroform and sterile olive oil in ratio 2:1.The different concentration were making by dilution of appropriate volume of acaricide with diluent solution as presented in table.

Concen.	Cyperthethrin
A	0.000015
B	0.00015
C	0.0015
D*	0.015
E	0.15
F	0.3

*Recommended dose

Larval packet test

All concentrations of each acaricides were impregnated by micropipette by streaking with 0.7ml to each filter paper (figure 1) which used by following larval packet methods:

a. Larval packet test which recommended by FAO (7),briefly by forming a packet by duplicate a 5×10 cm Watman filter paper and sealing it with 3 paper clips, after air drying ,the top clip was removed and a cluster ten days larvae (approx n=50) ,then the packet's top was resealed.
b. Modified larval packet test which is created to reduce alteration in acaricides concentration due to accidental touching between filter papers and /or contamination of

working site, this method was carried out by fitting the impregnated filter paper to bottom of glass petri dish, then about 50 larvae with age of 10 days were placed on it and covered with another same sized filter paper, finally covered by petri dish's lid, figure 2 and3.

In both above methods, the packets were kept for 24 hours at 27C and about 75% relative humidity ,then the mortality rate of larvae calculated by dividing the dead larvae by total larvae of each packet, every larvae able to walking considered as live. Also, One control packet was prepared for each method by impregnated it with solvent only.

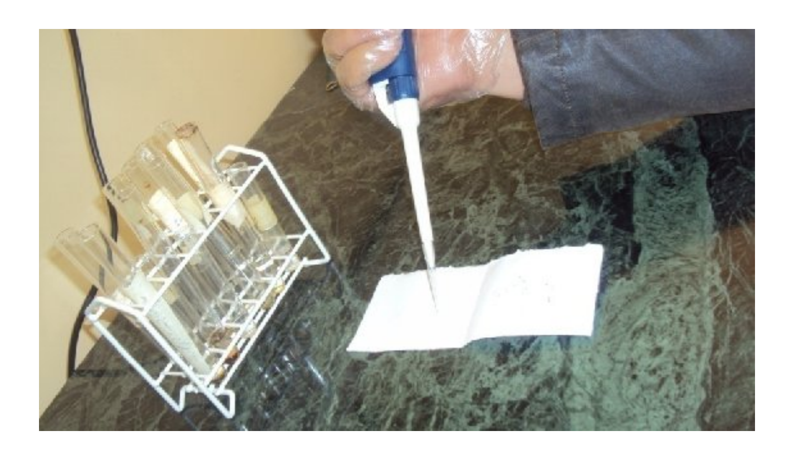


Figure 1 reveal the streaking of filter paper with cypermethrine by micro pipette

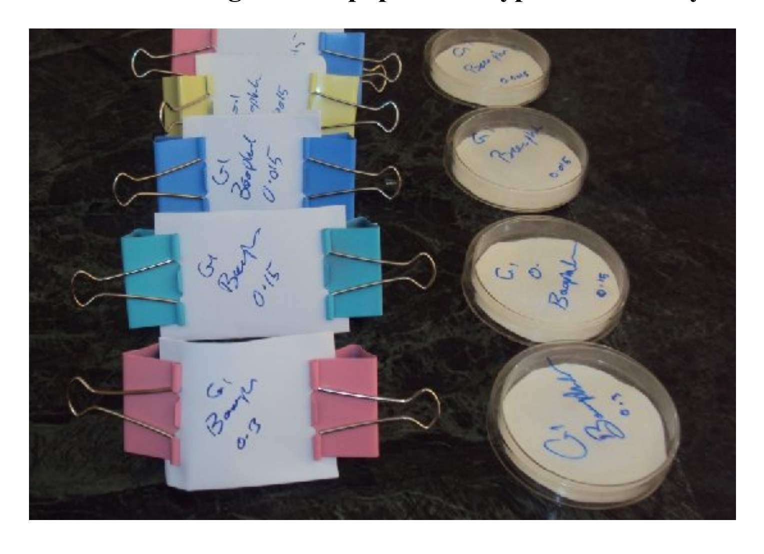


Figure 2 reveal the LPT method (left) and MLPT method (right)

Results

The results of questionnaire revealed that 95% of herdsmen use cypermethrine in treatment of acariasis, and 75% of them were preferred hand dressing among 20% and 5% of them which used pour-on and machine spraying respectively with no awareness to the exact recommended dose.

Incidence of acariasis

During this study, 612 adult ticks were collected from 125 animals in the different parts of Al-Najaf province During this study, 612 adult ticks were collected from 125 animals in the different parts of Al-Najaf province with infestation rate of 54.34%..Table 1,showed that 55.06% of collected ticks were *Hayaloma spp.*,while the percentage of *Boophilus* spp. and *Rhipicephalus* spp. Were 31.86% and 13.08% respectively. According to site of infestation, the highest percentage was recorded in udder 45%, followed by perineal region 25%, head –neck 18% and others 7%.

Table 1 reveals the incidence percentage of identified tick genera

Genus of tick	Total no.	Males	Females	%
Hyaloma	337	165	172	55.06
Boophilus	195	96	99	31.86
Rhipicephalus	80	37	43	13.08
total	612	298	314	-



Figure 3 reveal the infestation of udder region

***Boophilus* resistance to cypermethrin**

The results of larval packet test LPT are presented in table 2, which showed no significant variation between the mortality rates of *Boophilus* larvae at A and B concentration, while the mortality rate was 96.42% at recommended dose and all the larvae were dead at concentrations above the recommended dose. In other hand, table3 showed significant variation between the mortality rates of larvae by using the modified packet larval test (MLPT) .At recommended and double recommended doses, these rates were 94.82% and 98.04% respectively.

Table 2 reveal mortality rate of *Boophilus* larvae by larval packet test

Conce.	Total no.	live	Dead	%Mortality
A	53	44	9	20.45
B	57	45	12	21.07
C	48	17	31	64.58
D *	56	2	54	96.42
E	59	0	59	100
F	54	0	54	100
control	46	52	6	11.53

*recommended dose

Table3 reveal mortality rate of *Boophilus* larvae by modified larval packet test

Conce.	Total no.	live	Dead	%Mortality
A	50	45	5	10
B	56	45	11	19.64
C	60	24	36	61.5
D*	58	3	55	94.82
E	51	1	50	98.04
F	58	0	58	100
control	53	53	0	0

*recommended dose

***Hyalomma* resistance to cypermethrin**

The results of larval packet test are presenting in table 4,it showed no significant variation between mortality rates of *Hyalomma* larvae at concentrations of A and B, while the mortality rate at recommended dose was 96.72% with100% mortality rate in concentrations above recommended dose.

The results of modified larval packet test showed there were significant variations among the mortality rates of *Hyalomma* larvae as demonstrated in table 5.The mortality rate were 100% for each recommended and above recommended doses.Figures 1 and 2 reveal the comparative between the mortality rates of *Boophilus* and *Hyalomma* by using LPT and MLPT respectively.

Table 4 reveal mortality rate of *Hyalomma* larvae by larval packet test

Conce.	Total no.	live	Dead	%Mortality
A	53	44	9	20.45
B	61	48	13	21.31
C	52	22	30	57.69
D *	61	2	59	96.72
E	55	0	55	100
F	61	0	61	100
control	53	48	5	9.43

*recommended dose

Table 6 reveal mortality rate of *Hyalomma* larvae by modified larval packet test

Conce.	Total no.	live	Dead	%Mortality
A	55	49	6	10.9
B	53	34	19	35.84
C	59	15	44	74.57
D *	50	0	50	100
E	54	0	54	100
F	50	0	50	100
control	58	56	2	3.44

*recommended dose

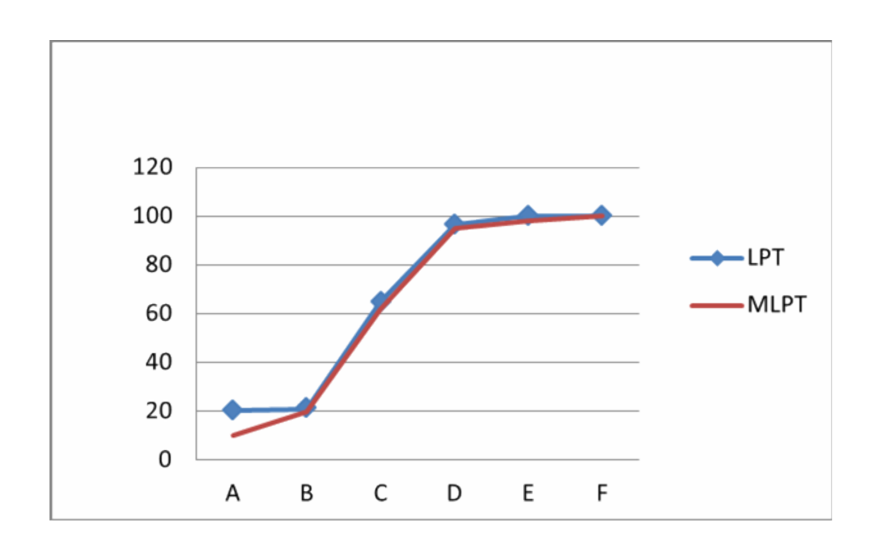


Figure 4 reveal the mortality rates of Boophilus larvae in LPT and MLPT methods

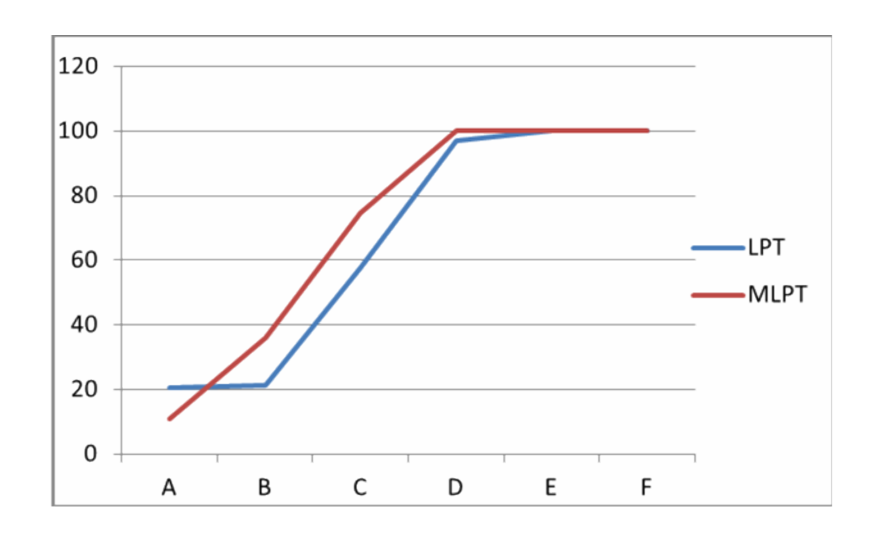


Figure 4reveal the mortality rates of Hyalomma larvae in LPT and MLPT methods

Discussion

The present study was identified 3genera of ticks in Al-Najaf province, the highest percentage those of *Hyalomma* followed by *Boophilus* and *Rhipicephalus*, these results were close to other surveys in some Iraq's governorates include surveys of Robson (8) in Diwanyia, Nassiryia, Kerbala and Hilla; Shamsuddin and Mohammad (9) in Baghdad; Hadi and Fatohi (10) in Nineveh; Abdl-Hussain (11)in Basra and with Al-Mahanna(12) in Diwanyia. The predominant of

Hyalomma may be due to their ability to tolerate the dry and harsh environment with little hiding places (13).The highest incidence of udder infestation which noticed in present study, may due to that the udder is a hairless, rich with blood supply and provide shelter from hot environment, this results in compatible with many authors (12, 14, 15).

In both LPT and MLPT methods, the resistance to cypermethrin was noticed in *Boophilus* was in agreement with many authors(5, 16,17 ,18),this resistance may be due to several factors including: prolonged application of an acaricide ,use of improper concentration ,or poor quality of water used in diluting the acaricides (19),most of these factors were confirmed by questionnaire part in this study. The difference between the mortality rates of *Hyalomma* at recommended dose in LTP and MLTP (96.72 % vs. 100%) may be due to contamination during the preparation of filter papers, in our study the papers were impregnated with different concentration of cypermethrin , the working place was cleaned very well after each impregnation. Despite all this measure contamination still be possible. The control filter papers were prepared on separated working place, so the mortality rates were noticed in control groups.

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دراسة الاصابة بالقراد ومقاومة القراد ضد السايبرمثرين Cypermethrin في محافظة النجف

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الخلاصة

اجريت الدراسة الحالية في شهر ايلول 2010 لمعرفة مدى اصابة الابقار بالقرادفي منطقة النجف مع تشخيص المقاومة ضد مبيد السايبرمثرين Cypermethrine باستخدام طريقتي LPTو MLPT .اظهرت النتائج الى ان نسبة الاصابة بالقراد كانت 54.34% وظهر ان 55.06% من القراد المجموع يعود لجنس *Hyaloma* بينما كانت نسبة قراد *Boophilus* و *Rhipicephalus* هي 31.86% و13.08على التوالي.أعتمادا على منطقة الاصابة كانت اعلى نسبة اصابة في منطقة الضرع 45% تلتها المنطقة العجانية 25% والرأس- الرقبة 18% والمناطق الاخرى 7%.

اظهرت نتائج طريقة LPT عدم وجود فرق معنوي على مستوى (P≤0.01) بين نسبة هلاك يرقات *Boophilus* 96.42% ويرقات Hyaloma 96.72% عند الجرعة الموصى بها.من ناحية اخرى اظهرت نتائج طريقة MLPT الى معدل هلاك يرقات Boophilus عند الجرعة الموصى بها وضعف تركيز الجرعة الموصى بها هي94.82% و98.04% على التوالي ,بينما هلكت جميع يرقات Hyalomma في تركيزالجرعة الموصى بها.